## (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

## (19) World Intellectual Property Organization International Bureau





## (43) International Publication Date 4 November 2004 (04.11.2004)

PCT

## (10) International Publication Number WO 2004/094319 A1

(51) International Patent Classification7:

\_\_\_\_

C02F 1/48

(21) International Application Number:

PCT/NO2004/000116

- (22) International Filing Date: 23 April 2004 (23.04.2004)
- (25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 0309224.4

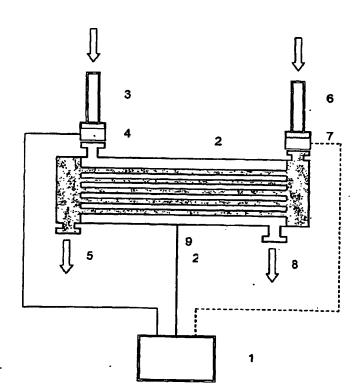
23 April 2003 (23.04.2003) GB

- (71) Applicant (for all designated States except US): EMT RE-SEARCH ASA [NO/NO]; Kjølnes ring 56, N-3918 Porsgrunn (NO).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): WASKAAS, Magne [NO/NO]; Sagdalsringen 43, N-3748 Siljan (NO).

- (74) Agents: ONSAGERS AS et al.; P.O.Box 6963 St. Olavs plass, N-0130 Oslo (NO).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK,

[Continued on next page]

(54) Title: METHOD FOR FLOW IMPROVEMENT AND REDUCTION OF FOULING IN PROCESS EQUIPMENT



(57) Abstract: This invention relates to a method and apparatus for improvement of flow rates and reduction of fouling in process equipment such as for instance heat exchangers (2) where fluids are flowing in single or multiphase. This is obtained by imposing a DC-potential at the walls of the process equipment that exactly opposes the naturally ocurring potential due to interaction between the walls of the process equipment and the fluid flowing inside. An improved flow rate will cause that the heat exchanger (2) becomes more efficient, i.e. a lower deposition rate and a higher removal rate of inorganic agents. The fluid may be a pure fluid, colloidal fluid or contain inclusions in the form of particles.